Massachusetts Water Resources Authority

Remote Headworks Upgrade Design and Construction Administration Services
MWRA Contract No. 7206

Risk-Based Disposal Plan

Chelsea Creek Headworks

May 2013

Report Prepared By:

Malcolm Pirnie
The Water Division of ARCADIS

200 Harvard Mills Square
Suite 430
Wakefield, MA 01880
781-224-4488

01740453.0000

The Water Division of ARCADIS

Contents

Tables

Figures

Appendices

1. Introduction

1.1. Project Overview

The Massachusetts Water Resources Authority (the “Authority” or “MWRA”) has retained the services of Malcolm Pirnie, the Water Division of ARCADIS U.S., Inc. (Pirnie/ARCADIS) to provide technical services related to polychlorinated biphenyl (PCB) sampling and analysis at the Chelsea Creek Remote Headworks facility (the “Facility”) located in Chelsea, Massachusetts. Pirnie/ARCADIS has prepared this Risk-Based Disposal Plan on behalf of the MWRA as part of a planned Facility-wide upgrade.

1.2. Background

The Facility provides preliminary treatment for the MWRA Northern Service Area combined sewage flows. The Facility removes solids and grit from combined sewage flows before entry to a tunnel system that conveys the wastewater to the Deer Island Treatment Plant (DITP). The Facility was constructed in the late 1950’s and became active in 1960. The Facility has been owned and operated by the MWRA since it was constructed. The Facility went through a major upgrade in 1987. In the 1987 upgrade, treatment process equipment was upgraded, and improvements were made to the other systems, such as air handling, and odor control.

Known uses of PCBs at the Facility are limited to building materials including paint and caulking. The Facility has not been used to manufacture PCBs and no PCBs or PCB-containing products are used in the Facility operations. A description of the Facility is provided in Section 2.

1.3 Regulations

PCBs in materials are regulated in accordance with the Toxic Substances Control Act (TSCA) PCB regulations in 40 Code of Federal Regulations (CFR) 761. In accordance with 40 CFR 761.3, PCB-containing paint and caulk are considered PCB bulk product waste if the concentration of PCBs in the paint or caulk is greater than or equal to ($\geq$) 50 ppm. The use of paint and caulk with PCB concentrations equal to or greater than 50 ppm is not authorized for use and must be disposed of as PCB bulk product waste according to 40 CFR 761.62. The cleanup of any porous or non-porous building surfaces contaminated by this paint and caulking would be governed by 40 CFR 761.61. The disposal requirements for PCB contaminated building materials are regulated under 40 CFR 761.61.

Paint, caulking, and other non-liquid building materials that contain PCBs at concentrations less than 50 ppm do not meet the definition of a PCB bulk product waste and are not regulated for disposal.

2. Site Description

2.1. General Description

The Facility is located at 340 Marginal Street in Chelsea, Massachusetts. The location of the Facility is shown on Figure 1 included in Appendix A. The Facility consists of approximately 26,000 square feet (sf) of total floor area divided into three stories above grade, two stories below grade (an operating level and a mezzanine level), and a penthouse on the roof of the building. Floor plans depicting pertinent building features and sample locations are included as Figures 2 through 5 of Appendix A. Descriptions of each floor are included in the following sections. A photograph log is included in Appendix B.

2.1.1. Operating Level Description

The operating level is the lowest level of the building (MWRA Sewer Datum of 88.75’). The floor area of this level is approximately 12,000 sf. There are four preliminary treatment channels flowing beneath the operating level. Openings in the floor around the channels are surrounded by protective guardrails. Grit and screenings collection equipment is located on the west end of the operating level. The floors, walls, and ceilings in this level are poured concrete. Structural concrete columns are located throughout the level.

2.1.2. Mezzanine Level Description

The mezzanine level is a 7,000 sf balcony level located between the west end of the operating floor and the ground floor (elevation 103.75’). The level contains the existing hydraulic system operators and duct work. A hatch at grade level provides access for large equipment to the mezzanine level, which can be moved to the operating floor via large openings in the mezzanine level floor. The openings in the floor are protected by guardrails. The floors, walls, ceilings, and columns in this level consist of poured concrete.

2.1.3. Grade Level Floor

The grade level floor is approximately 3,150 sf and situated at elevation 117.12’ and is used for offices, a control room, a generator room, a boiler room, an odor control room, an employee lounge, and a garage. The floors and ceilings of this level are of poured concrete. The interior walls are concrete masonry block walls faced with 2-inch glazed tile or cement plaster. The exterior façade is a combination of brick and insulated metal panel system.

2.1.4. Floors Above Grade Level

The floors above grade level are Upper Level 1 (elevation 128.40') and Upper Level 2 (elevation 139.11'). Both of these levels are approximately 1,800 sf. Upper Level 1 floor contains a locker room and storage, and Upper Level 2 is used for storage. There is access to the roof via a door on Upper Level 2. An exterior ladder provides access to the Penthouse (approximately 200 sf) which houses mechanical equipment for the cable freight elevator.

The floors and ceilings in these levels consist of poured concrete with concrete columns. Interior walls are either exposed concrete masonry blocks or concrete masonry block walls faced with 2-inch glazed tile or cement plaster. In some locations on the interior face of the exterior walls, metal panels and cross bracing are exposed. The elevator shaft servicing all five levels of the building is constructed of concrete masonry unit (CMU). The exterior building walls are constructed of an insulated metal panel system.

3. PCB Sampling Program

3.1. Summary of Sampling

A preliminary hazardous materials evaluation was conducted at Chelsea Creek Headworks and two other facilities in 2010. The preliminary evaluation was conducted by Rhode Island Analytical Laboratory (RIAL) personnel under the direction of Pirnie/ARCADIS and consisted of a PCB investigation, lead-based paint (LBP) sampling, and suspect asbestos containing materials (ACM) sampling.

Pirnie/ARCADIS conducted three additional rounds of sampling at the Facility. Sampling events were conducted in October-November 2011 (Round 1), September 2012 (Round 2), and October 2012 (Round 3). Samples collected in Round 1 were from building materials including: paint; caulking; noise control panels; and air filters. Samples collected in Rounds 2 and 3 were porous substrate (concrete).

3.1.1. Initial Sampling - Rhode Island Analytical (2010)

The preliminary hazardous materials evaluation conducted in 2010 by RIAL included PCB, LBP, and ACM evaluations at the Facility.

A total of 17 samples of suspect PCB-containing materials were collected from the Facility. Sample locations were selected based on the judgment and experience of sampling personnel. PCBs were detected in 11 of the 17 samples, and PCBs were detected in excess of 50 parts per million (ppm) in 8 of the 17 samples.

The preliminary hazardous materials evaluation was summarized in a March 2011 report by Pirnie/ARCADIS. Sections of that report pertaining to PCBs at the Facility are included in Appendix C. The preliminary evaluation provided screening data to evaluate whether supplemental sampling was warranted. The laboratory analytical results of the preliminary evaluation have been included in the table in Appendix D.

3.1.2. Round 1 Sampling- Suspect PCB Containing Materials

3.1.2.1. Nomenclature

Round 1 sampling at the Facility was conducted in 2011. Sample locations were clearly marked in-situ with a sample identification number written in permanent marker for future reference. Each sample was uniquely identified by a five level nomenclature labeling system as follows:

- Level 1: Consists of the MWRA assigned, two letter code that identifies the Facility.

  - Chelsea Creek Headworks: **KE**
- Level 2: Consists of a three letter code that identifies the level of the building at which the sample was taken from.
  - Lower Level 1 (operating floor): **LL1**
  - Lower Level 2 (mezzanine level above operating floor): **LL2**
  - Grade Level Interior: **GLI**
  - Grade Level Exterior: **GLE**
  - Upper Level 1 (first floor above grade level): **UL1**
  - Upper Level 2: **UL2**
  - Upper Level Exterior: **ULE**
  - Penthouse Interior: **PHI**
  - Penthouse Exterior: **PHE**
- Level 3: Identifies the painted substrate structure and/or component/equipment (e.g. floor, ceiling, wall, column, window frame, drain pipe, potable water pipe, exterior siding). This level also identifies where a caulking sample was taken.
- Level 4: Identifies the paint color. If a sample is from caulking, filter, or noise control panel, the type of material would be included in lieu of paint color.
- Level 5: Consists of a three digit number that corresponds to the order the sample was collected at the Facility.

As an example of this labeling, the first sample collected at the Facility was a paint chip collected from the white ceiling of the operating level. The sample identification assigned was: **KE.LL1.Ceiling.White.001**.

During field sampling, the location (including vertical distance, as appropriate) and identification number of each sample were recorded on existing Facility drawings which are included as Appendix A.

3.1.2.2. Sampling and Testing Methodologies

Round 1 sampling of suspect PCB-contaminated building materials was performed using disposable utility blades or paint scraper blades. Non-disposable equipment (scraper handles or utility knives) were decontaminated between sample locations in accordance with the decontamination procedures outlined in Section 11 of *U.S. EPA Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBS)* ("U.S. EPA SOP").

Investigation derived waste potentially contaminated with PCBs was collected in appropriately labeled and sealed five gallon containers located in designated storage areas for disposal. Decontamination fluids were containerized in a separate container for disposal.

If multiple paint layers were found at a given location, attempts were made to collect samples of individual layers for analysis. All paint chip grab samples collected consisted of discrete or composite layers of paint adhered to a structural substrate and/or component/equipment surfaces. Samples were individually placed in sample containers and provided to the analytical laboratory with the appropriate sample identification label. The samples were analyzed by EPA SW-846 3540C Soxhlet Extraction and 8082 methodology for PCBs with a Method Detection Limit less than 1 ppm.

3.1.2.3. Sample Frequency

Round 1 sampling was conducted to characterize PCB bulk product waste in the different levels of the building. Multiple samples of homogeneous matrices were collected from each level to evaluate special variation in material composition. The sampling scheme was developed in general conformance the protocol defined by National Emissions Standards for Hazardous Air Pollutants (NESHAP), which references the EPA Asbestos Hazard Emergency Response Act (AHERE) field sampling protocol 40 C.F.R. § 763.86. This protocol was used in the absence of applicable guidance for sampling paint as PCB bulk product waste in the Toxic Substances Control Act (TSCA) regulations.

A total of 168 samples were collected from the Facility during Round 1, which included 144 matrix samples and 24 quality assurance (QA) samples: 6 equipment blanks, 6 field duplicates, 6 matrix spikes (MSs) and, 6 matrix spike duplicates (MSDs).

Round 1 matrix samples included the following materials:

- 124 paint samples;
- 15 caulk samples;
- 2 noise control panels; and
- 3 air filter samples.

The analytical results of Round 1 sampling are discussed in Section 4.3.

3.1.3. Round 2 and 3 Sampling - Substrate

3.1.3.1. Nomenclature

Samples collected in Rounds 2 and Round 3 were identified based on the results of the previous sampling activities. Round 2 consisted of collecting shallow concrete core samples (0 to 0.5-inch depth) at locations where Round 1 paint or caulk samples contained PCBs at a concentrations exceeding 50 ppm. Round 3 consisted of collecting a 0.5-inch to 1-inch core sample at locations where PCBs were identified in the Round 2 samples at a concentration exceeding 50 ppm. At 13 locations, the 0 to 0.5-inch and 0.5-inch to 1-inch depth interval samples were collected and analyzed concurrently due to the level of effort required to access the elevated sampling location. The Round 2 and Round 3 samples used the same sample nomenclature for Levels 1 and 2 as specified in Section 3.2.1.1. Levels 3, 4, and 5 differ slightly as follows:

- Level 3: Identifies the three digit sequential sample number. This number corresponds to the order the sample was collected at the Facility.
- Level 4: Identifies the substrate. Concrete is the only substrate sampled, which is identified as "CON."
- Level 5: Consists of the depth interval from which a sample was collected, either 0-0.5" or 0.5-1".

As an example of this labeling, the concrete samples collected from beneath the paint sample **KE.LL1.Ceiling.White.001** are identified as follows:

- Round 2 - **KE.LL1.179.CON.0-0.5"**
- Round 3 - **KE.LL1.201.CON.0.5-1"**

Sample locations were clearly marked in-situ with a sample identification number written in permanent marker for future reference in development of contract documents for remediation.

3.1.3.2. Sampling and Testing Methodologies

Concrete sampling was conducted in accordance with the U.S. EPA SOP. A summary of pertinent sampling methodologies is presented below:

- Small-scale containment zones were constructed at each substrate sample location to prevent migration of PCB-containing dust or solids.
- Paint layers were removed down to the surface of the porous substrate using mechanical grinders. Painted surfaces were wetted prior to grinding to minimize dust. Airborne particulate monitoring equipment was set up outside the containment zones to monitor dust while grinding the paint. The area of paint disturbed was limited to what was necessary to collect adequate substrate sample volume.
- The porous surfaces were cleaned with a vacuum and were wet wiped to remove residual paint or dust.

- Porous substrate samples were collected from the 0-0.5” interval of the concrete floors, walls, columns and ceilings using rotary impact hammer drill with a one-inch drill bit to generate a fine powder material that is easily extracted in accordance with the U.S. EPA SOP.

- A ½” drill bit was used to collect samples from the 0.5-1” intervals in accordance with the U.S. EPA SOP. A vacuum pump trap apparatus, as shown in Figure 3-1 at the end of this Section, was used to clear residual dust from the surficial sample interval before sampling from deeper intervals.

- Substrate samples were collected from ceilings by using a drill bit mounted through the center of an aluminum pan to catch pulverized material as it fell from the sample location.

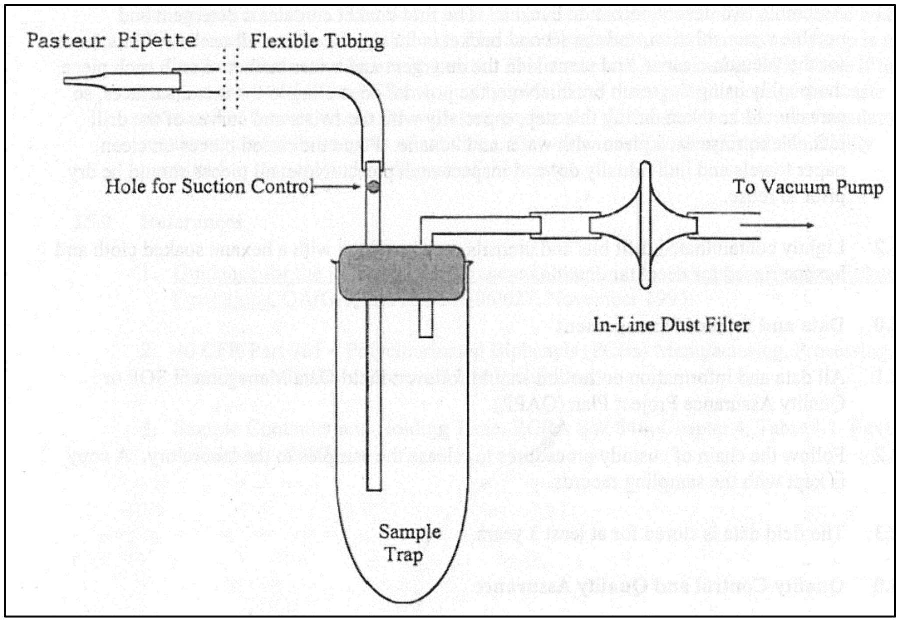
- For collecting porous substrate samples from walls/columns, aluminum foil trays were fashioned and taped to the wall directly below the sample location, allowing falling pulverized material to fall directly into the trays.

- Reusable materials (drill bits, vacuums, hand tools, drill) were decontaminated between sample locations in accordance with Section 11 of the U.S. EPA SOP. Disposable equipment (aluminum foil, personal protective equipment, bags, polyethylene sheeting, etc.) were disposed of after single use. Investigation derived waste was staged at the Facility for proper disposal.

- Decontamination fluids were properly captured and staged at the Facility in a designated storage area for later management.

- Concrete substrate grab samples were collected in sample containers provided by the analytical laboratory and managed under chain-of-custody protocol. The samples were analyzed by EPA SW-846 3540C Soxhlet Extraction and 8082 methodology for PCBs with a Detection Limit of 0.5 ppm.

- **Figure 3-1: Vacuum Trap Design**



Reference: US EPA. Standard Operating Procedure for Sampling Porous Surfaces for PCBs. May 2011.

3.1.3.3. Sample Frequency

A summary of Round 2 and Round 3 sampling is as follows:

- Concrete core samples for the 0 to 0.5-inch depth interval were collected from 71 locations, which included 69 Round 1 paint sample locations, one Round 1 caulk sample location, and one paint sample location from the preliminary hazardous materials evaluation.

- Concrete core samples for the 0.5-inch to 1-inch depth interval were collected from 38 locations.

A discussion of laboratory analytical results is discussed in Section 4.

4. Laboratory Analytical Results

4.1. Summary of Laboratory Analytical Results

The data table in Appendix D presents a summary of laboratory data from the preliminary hazardous materials evaluation, and Rounds 1 through 3 of the PCB sampling. The data table is organized by sample location so that substrate concentrations corresponding to painted surfaces can be readily evaluated. For example, the three samples listed below are collected from a singular location and represent samples from Rounds 1, 2, and 3.

KE.LL1.Ceiling.White.001
KE.LL1.179.CON. 0-0.5in
KE.LL1.210.CON.0.5-1in

4.2. Preliminary Hazardous Materials Investigation

Seventeen samples of suspect PCBs were collected by RIAL personnel in 2010. PCBs were detected in excess of 50 ppm in eight of the 17 samples submitted for analysis. PCBs were not detected above 1 ppm in six samples. PCBs were detected between 1 ppm and 50 ppm in three of the samples. Laboratory analytical results from the preliminary hazardous materials evaluation are included in Appendix D.

4.3. Round 1 Laboratory Analytical Results

One hundred forty four (144) primary samples were submitted from the facility for PCBs analysis. Fifteen of the primary samples were caulking, two were noise panel samples, three air filter samples (lounge, office and locker room) and the remainder were samples of paint. Pirnie/ARCADIS was able to separate top and bottom layers of paint in five locations at this facility. A summary of the sample data is as follows:

- PCBs were not detected above 1 ppm in 6 samples, including three caulking samples and two noise panel samples;
- PCBs were detected at concentrations ranging from 1 ppm to 50 ppm in 42 samples, which includes 8 caulking samples;
- PCBs were detected at concentrations exceeding 50 ppm (up to 60,000 ppm) in 96 of the samples (including 4 caulking samples) submitted for laboratory analysis.

Additional details regarding the Round 1 sampling analytical results are provided in Section 5.

4.4. Round 2 and 3 Laboratory Analytical Results

A total of 109 concrete samples were collected in Round 2 (58 samples) and Round 3 (51 samples). A total of 71 samples were collected from 0-0.5” intervals. Analytical results of these samples are summarized below:

- PCBs were not detected above 1 ppm in 6 samples;
- PCBs were detected at concentrations ranging from 1 ppm to 50 ppm in 35 samples; and
- PCBs were detected above 50 ppm in 30 samples.

A total of 38 samples were collected from 0.5-1” in Round 3. Analytical results of those samples are summarized below:

- PCBs were not detected above 1 ppm in 8 samples;
- PCBs were detected at concentrations ranging from 1 ppm to 50 ppm in 25 samples; and
- PCBs were detected in excess of 50 ppm in 5 samples.

4.5. Quality Assurance/Quality Control (QA/QC)

The preliminary hazardous materials evaluation was performed by Rhode Island Analytical Laboratory (RIAL) under the supervision of Pirnie/ARCADIS personnel. Samples were submitted to RIAL for analysis. RIAL is a laboratory certified by the Commonwealth of Massachusetts. A total of 17 solid samples were submitted as part of the evaluation. All samples were collected and placed in laboratory supplied glassware, and submitted under standard chain-of-custody procedures to the contract laboratory.

Qualified Pirnie/ARCADIS representatives performed field activities for Rounds 1, 2 and 3. Laboratory analyses were performed by EMSL Analytical, Inc. and ConTest Laboratories. The analytical laboratories are certified by the Commonwealth of Massachusetts and U.S. EPA. All samples were collected and placed in laboratory supplied glassware, and submitted under standard chain-of-custody procedures to the contract laboratory.

A total of 253 primary samples were submitted in Rounds 1 through 3. Field duplicates, equipment blanks, and MS/MSDs were submitted at an approximate frequency of one per 20 samples. The samples were logged on the chains-of-custody and the laboratories were required to submit internal QA/QC narratives with the findings summarizing internal QA/QC results. The QA/QC results are presented in Appendix F and are summarized in the following sections.

5. Nature of Contamination

5.1. Paint

A summary of the area of PCB contaminated paint is presented in Table 5-1. Approximately 90 percent of the painted surfaces in the Facility are the red floors, the white walls/columns, and the white ceilings, all of which are on porous surfaces. The square footage of paint containing less than 1.0 ppm, 1-50 ppm, and greater than 50 ppm PCBs has been determined from the maps in Appendix A and are provided on Table 5-1.

Table 5-1:
Major Areas Impacted by PCBs in Paint

Substrate	Substrate Type	Total Area	Area Based on PCB Concentration					
			0.0 < 1.0 ppm		1.0 < 50 ppm		> 50 ppm	
		(SF)	%	SF	%	SF	%	SF
Lower Level 1 (LL1) - EL. 88.75								
Floor	Concrete	12,500	0%	0	50%	6,250	50%	6,250
Walls/Columns	Concrete	14,500	0%	0	0%	0	100%	14,500
Ceiling	Concrete	22,000	0%	0	0%	0	100%	22,000
Lower Level 2 (LL2) - EL. 103.75								
Floor	Concrete	5,500	0%	0	0%	0	100%	5,500
Walls/Columns	Concrete	6,000	0%	0	0%	0	100%	6,000
Ceiling	Concrete	7,000	0%	0	0%	0	100%	7,000
Grade Level Interior (GLI) - EL. 117.12								
Floor	Concrete	3,150	0%	0	100%	3,150	0%	0
Walls/Columns	Concrete	2,550	0%	0	10%	255	90%	2,295
Ceiling	Concrete	2,700	0%	0	40%	1,080	60%	1,620
Upper Level 1 (UL1) - EL. 128.40								
Floor	Concrete	950	0%	0	0%	0	100%	950
Walls/Columns	Concrete	1,250	0%	0	0%	0	100%	1,250
Ceiling	Concrete	1,350	0%	0	0%	0	100%	1,350
Upper Level 2 (UL2) -EL. 139.11								
Floor	Concrete	1,640	0%	0	0%	0	100%	1,640
Walls/Columns	Concrete	1,820	0%	0	0%	0	100%	1,820
Ceiling	Concrete	1,800	0%	0	0%	0	100%	1,800
Penthouse Interior (PHI) - EL. 150.75								
Floor	Concrete	144	0%	0	0%	0	100%	144
Walls/Columns	Concrete	380	0%	0	100%	380	0%	0
Ceiling (no paint)	Concrete	0	0%	0	0%	0	0%	0
Subtotal		**85,234**	-	**0**	-	**11,115**	-	**74,119**

The paint sampling results indicate that portions of the lower level floor and portions of the walls, columns, and ceiling on the grade level are coated with paint that contains PCBs at concentrations of less than 50 ppm. In addition, PCBs were not identified at concentrations exceeding 50 ppm in paint samples collected from the grade level floor or from the walls/columns of the penthouse. Based on the similarity of paint colors throughout the building, MWRA is not able to determine whether different paint products were applied to surfaces where PCBs were detected at concentrations of less than 50 ppm. Therefore, MWRA proposes to remove all painted surfaces inside the building as if they are coated with paint containing greater than 50 ppm PCBs.

5.2. Caulking, Noise Panels, and Air Filters

Twenty samples of non-paint source material were analyzed for PCBs in Round 1. PCBs were not detected above laboratory method detection limits in the two noise panel samples and three caulking samples. PCBs were detected at concentrations between 1 ppm and 50 ppm in the three air filter samples, and eight caulking samples. PCBs were detected above 50 ppm in four caulking samples.

Table 5-2:
Caulking Samples

PCBs in Caulk Less Than 1 ppm	
Sample ID	**Concentration**
KE.GLE.Door Frame.GrayCaulk.118	ND
KE.GLE.Escape Hatch.White Caulk.119	ND
KE.GLE.Escape Hatch.Gray Caulk.121	ND
PCBs in Caulk 1-50 ppm	
Sample ID	**Concentration**
KE.GLE.Louver Frame.Brown Caulk.123	1.2
KE.GLE.Window Frame.Gray Caulk.120	1.7
KE.GLE.Wall Spacer.Gray Caulk.124	7.9
KE.ULE.Window Frame.Gray Caulk.132	16.5
KE.GLE.Wall Spacer.White Caulk.125	20
KE.GLE.Window Frame.Gray Caulk.127	30.6
KE.GLE.Wall Spacer.Gray Caulk.128	31.8
KE.GLE.Window Frame.White Caulk.126	43.6
PCBs in Caulk Greater Than 50 ppm	
Sample ID	**Concentration**
KE.ULE.Roof Spacer.White Caulk.129*	144
KE.PHE.Window Frame.Gray Caulk.131	173
KE.ULE.Window Frame.Gray Caulk.130	227
KE.GLE.Louver Frame.Gray Caulk.122	800

Note: * = porous surface

The majority of caulk identified at the facility was located between two adjacent non-porous surfaces (such as metal flashing around window frames and wall penetrations). PCBs were identified at a concentration exceeding 50 ppm in only one caulk sample that was collected adjacent to a porous surface (sample KE.ULE.Roof Spacer.White Caulk.129, which was collected at a roof hatch which was supported by a concrete frame). PCBs were not detected in two core samples of the porous concrete located immediately adjacent to the caulk sample location. It is likely that most of the caulk that is present in the building will be removed by the facility upgrade activities. Any remaining undisturbed caulk that contains PCBs at a concentration of less than 50 ppm is considered to be an excluded PCB product.

5.3. Paint on Non-Porous Surfaces

A total of 28 paint samples were collected from non-porous surfaces. One paint sample was collected from each individual non-porous surface, including two samples of the exterior siding, one sample from the exterior flag pole, and one sample from the exterior communications tower. A summary of non-porous surfaces coated with paint is subsequently presented:

Table 5-3:
Non-Porous Surfaces Coated With Paint

Sample ID	Concentration
Less Than 1 ppm	
KE.GLE.Flag Pole.White.143	ND
Sample ID	**Concentration**
1-50 ppm	
KE.PHE.Siding.White.091	1.3
KE.LL2.Potable Pipe.Blue.038	2.7
KE.GLI.Potable Pipe.Blue.057	4.9
KE.LL1.Monorail.Yellow.008	6
KE.LL1.Beam.Gray.023	6.8
KE.GLI.Drain Pipe.Tan.067	7.9
KE.PHE.Siding.Pink.090	8.4
KE.LL2.Beam.Yellow.049	11.31
KE.GLE.Communications Tower.Orange.144	12.1
KE.UL1.Drain Pipe.Gray.078	12.8
KE.PHI.Window Frame.Gray.089	28.5
KE.UL1.Potable Pipe.Blue.084	45.1
Sample ID	**Concentration**
Greater Than 50 ppm	
KE.LL1.Potable Pipe Insulation.020	218

Table 5-3 Continued	
Sample ID	**Concentration**
Greater Than 50 ppm	
KE.LL1.Elevator Frame.Gray.018	249
KE.Wall.White.074	940
KE.UL1.WindowFrame.Gray.083	1,380
KE.UL2.DrainPipe.Gray.096	1,930
KE.GLI.Elevator Frame.Gray.063	2,030
KE.UL2.Wall.White.104	2,240
KE.UL2.Window Frame.Gray.103	3,750
KE.LL1.Drain Pipe.Gray.025	6,000
KE.UL2.Elevator Frame.098	8,300
KE.GLI.Window Frame.Gray.061	9,800
KE.GLI.DoorFrame.Gray.069	9,800
KE.LL2.Drain Pipe.Gray.040	11,600
KE.UL1.Elevator Frame.Gray.077	11,700
KE.LL2.Door.DarkGray.043	20,500

A total of 15 coatings on non-porous surfaces were found to exhibit PCB concentrations in excess of 50 ppm, and 1 coated surface sample exhibited a PCB concentration of 45 ppm. Samples KE.UL1.Wall.White.074 and KE.UL2.Wall.White.104 represent approximately 800 sf of paint. The other non-porous surfaces covered by these paints are each less than 100 sf.

Non-porous surfaces that are coated with paint containing PCBs at a concentration exceeding 50 ppm will be addressed by this risk-based disposal plan. It is likely that many of the non-porous surface that are coated with paint that contains less than 50 ppm PCBs will be removed as part of the facility-wide upgrade project. Any remaining non-porous surfaces that are coated with paint containing less than 50 ppm PCBs are considered to be an excluded PCB product.

5.4. Paint on Porous Surfaces (Concrete)

Pirnie/ARCADIS used the data generated in Rounds 2 and 3 to characterize the extent of PCBs in concrete throughout the building, which is summarized as follows:

- PCBs were detected in surficial samples (0.0” - 0.5”) at concentrations exceeding 50 ppm in samples that represent approximately 44,000 sf of concrete. The total volume is approximately 68 cubic yards (cy).

- PCBs were detected in 0.5-1” samples at concentrations exceeding 50 ppm in samples that represent approximately 7,000 sf. (The ceiling in LL2). The volume of concrete in the 0.5-1” interval is approximately 11 cy.
- PCBs were detected in surficial samples (0.0” - 0.5”) at concentrations exceeding 1 ppm in samples that represent approximately 73,000 sf of concrete, or 112 cy.
- PCBs were detected in 0.5-1” interval samples at concentrations exceeding 1 ppm in samples that represent approximately 44,000 sf, or 67 cy.

A tabular summary of affected concrete, by floor level and sample type are presented in the following table:

Table 5-4:
Volume Estimates of PCB-affected Substrate

Substrate	Total Area	Area Based on PCB Concentration			PCB Concentration Range (ppm)
		0.0 < 1.0 ppm	1.0 < 50 ppm	> 50 ppm	
Lower Level 1 (LL1) - EL. 88.75					
Floor	6,250	-	5,625	625	1.6 - 53
Walls/Columns	14,500	-	11,600	2,900	10 - 56
Ceiling	22,000	-	-	22,000	62 - 280
Lower Level 2 (LL2) - EL 103.75					
Floor	5,500	-	5,500	-	1.17 - 10
Walls/Columns	6,000	-	-	6,000	15.7 - 470
Ceiling	7,000	-	-	7,000	170 - 458
Grade Level (GLI) - EL 117.12					
Floor	-	-	-	-	-
Walls/Columns	2,295	-	1,721	574	7 - 52
Ceiling	1,620	-	810	810	3 - 102
Upper Level 1 (UL1) - EL 128.40					
Floor	950	237	713	-	0.68 - 12
Walls/Columns	1,250	-	625	625	4.3 - 196
Ceiling	1,350	450	900	-	0.1 - 5
Upper Level II (UL2) - EL 139.11					
Floor	1,640	410	1,230	-	0.32 - 9.1
Walls/Columns	1,820	-	455	1,365	36 - 168
Ceiling	1,800	-	720	1,080	2.1 - 430
Penthouse (PHI) - EL 150.75					
Floor	196	-	196	-	ND - 2
Walls/Columns	-	-	-	-	-
Ceiling	-	-	-	-	-

Notes: 1. Units are in square feet unless otherwise noted.

6. Evaluation of PCB Cleanup Alternatives

6.1. Summary of Remedial Alternatives

A review of five remedial alternatives was conducted for the Facility, which are summarized below:

- *Alternative 1 - Remove Paint Exceeding 50 ppm, Encapsulate Surfaces Exceeding 1 ppm.* Under this alternative, paint will be removed from all painted surfaces using a power washer, water blaster, or similar method. Concrete with a concentration greater than 1 ppm PCBs will be encapsulated. Cracks in the surfaces will be repaired/caulked, and all surfaces will be cleaned and deglossed, as needed. A two-layer contrasting color epoxy coating system will be applied over the paint to create an impermeable barrier. After curing, the barrier will be inspected for integrity on an annual or semiannual basis. PCB concentrations which will remain in the encapsulated concrete surfaces are summarized in Table 5-4. Generated waste will be stored in appropriate containers for characterization and off-site disposal. Waste will be sampled and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) Lead. PCB bulk product waste that exceeds TCLP regulatory limits will be subject to RCRA Land Ban Treatment regulations prior to disposal. Approximately 85,000 sf of painted surfaces will be stripped of paint and encapsulated under this alternative.

- *Alternative 2 – Remove Paint & Concrete Exceeding 50 ppm (less than 9' from floor and no ceilings), Encapsulate Surfaces Exceeding 1 ppm.* Under this alternative, paint (less than 9 feet above the floor, and no ceilings) will be removed from surfaces using the same methods described in Alternative 1. Concrete with a concentration of greater than 50 ppm PCBs in high-contact areas will be removed using a surface planer (concrete scarifier), needle guns, or a similar method. Concrete will be removed to a depth of 1" – 1.5" dependent on the depth of the sample cores. All remaining paint with a concentration greater than 1 ppm PCBs will be encapsulated using the methods described in Alternative 1. Generated waste will be handled and disposed using the methods described in Alternative 1. Approximately 25,000 sf of painted surfaces and 15 cubic yards (cy) of concrete (approximately 10,000 sf) will be removed, and 10,000 sf of painted surfaces will be encapsulated under this alternative.

- *Alternative 3 - Remove Paint & Concrete Exceeding 50 ppm, Encapsulate Surfaces Exceeding1 ppm.* Under this alternative, paint and concrete containing PCBs at a concentration exceeding 50 ppm will be removed from surfaces using the same methods described in Alternative 2, but includes all low & high contact areas (including walls above 9' and ceilings). All remaining paint with a concentration greater than 1 ppm PCBs will be encapsulated using the methods described in Alternative 1. Generated waste will be handled and disposed using the methods described in Alternative 1. Approximately 30,000 sf of painted surfaces and 80 cy of concrete (approximately 43,000 sf) will be removed, and 12,000 sf of painted surfaces will be encapsulated under this alternative.

- *Alternative 4 - Remove Paint Exceeding 50ppm, Remove Concrete Exceeding 1 ppm, Encapsulate Surfaces Exceeding 1 ppm.* Under this alternative, paint greater than 50 ppm and concrete greater than 1 ppm will be removed from surfaces using the same methods described in Alternative 2, including all low & high contact areas. All remaining paint with a concentration greater than 1 ppm PCBs will be encapsulated using the methods described in Alternative 1. Generated waste will be handled and disposed using the methods described in Alternative 1. Approximately 180 cy of concrete (approximately 73,000 sf) will be removed, and 12,000 sf of painted surfaces will be encapsulated under this alternative.

- *Alternative 5 – Remove Paint and Concrete Exceeding 1ppm.* Under this alternative, paint and concrete exceeding 1 ppm will be removed from surfaces using the methods described in Alternative 2, including all low & high contact areas. Generated waste will be handled and disposed using the methods described in Alternative 1. Approximately 180 cy of concrete (approximately 73,000 sf) and 12,000 sf of paint will be removed under this alternative.

6.2. Recommended Remedial Alternative

Pirnie/ARCADIS conducted a review of the five alternatives listed above. Based on the review, Alternative 1 has been selected as the recommended remedial alternative that is protective of human health and the environment and most closely matches the anticipated future use of the facility.

Alternatives 2 through 5 would be protective of human health and the environment; however, the added level of effort required to implement these alternatives are not justified based on the following considerations:

- The planned facility upgrades will automate much of the operation, thereby reducing the amount of exposure time to human receptors.

- The level of effort and cost associated with removing concrete is not justified because the concrete surfaces will be encapsulated, thereby reducing the risk to exposure.
- The concrete surfaces are structural, load bearing members. Scarification of 0.5” or more of concrete could potentially compromise the integrity of the structure.

Remedial Alternative 1 is considered to be feasible. Under this remedial alternative, paint will be removed from all surfaces inside the building, thereby mitigating risk of continued exposure to source materials. Non-porous surfaces will be abated and decontaminated to the cleanup standards specified in 40 CFR 761.61(a)(4)(ii). Porous surfaces will be encapsulated as discussed below to mitigate risk of exposure to PCBs within the concrete substrate beneath the encapsulated surfaces.

A long-term maintenance and monitoring plan (MMP) would be implemented, along with a deed restriction, thereby making the solution permanent and effective in mitigating risk to human health.

6.3. Risk Assessment

This risk assessment considers potential risks attributable to the presence of PCBs in building materials for facility workers at Chelsea Creek Headworks, and supports the selection of a remediation alternative intended to eliminate exposure to PCBs in building surfaces.

6.3.1. Hazard Identification

Samples of suspect PCB-contaminated building materials were collected as samples of concrete that were forcefully removed from the walls and floors and other surfaces for the purpose of comparison to a guideline for waste classification (50 ppm). Concentrations on contacted surfaces, as measured in wipe samples, would provide a more representative concentration of PCBs contacted by workers. Use of the data from concrete and paint samples likely overstates the concentrations that workers may contact. Nonetheless, these data can serve to identify surfaces that represent a potential health risk to workers.

Samples of building materials were submitted for analysis of PCBs based on Aroclors. Aroclor is a PCB mixture produced from approximately 1930 to 1979. It is one of the most common known trade names for PCB mixtures. There are many types of Aroclors and each has a distinguishing suffix number that indicates the degree of chlorination. “Aroclor and other PCB Mixtures.” EPA, Environmental Protection Agency, n.d. Web 19 Mar 2013. Of the 9 Aroclors tested, 5 were detected: Aroclors 1016, 1242, 1248, 1254, and 1260.

The frequency of detection of PCBs in interior building surfaces is discussed by surface location to distinguish surfaces likely to be contacted routinely by facility workers (i.e., floors and walls/other surfaces below a height of 9 feet from the floor) from those surfaces not likely to be contacted routinely by facility workers (i.e., ceilings and walls/other surfaces above a height of 9 feet from the floor).

As shown in Table 6-1, Aroclor-1254 was the most frequently detected Aroclor in building material samples. Aroclor-1260 was also frequently detected, in approximately half as many samples (floor and walls/other surfaces below a height of 9 feet from the floor) as Aroclor-1254. The frequency of detection of Aroclor-1248 in building material samples ranged from approximately 14 to 19 percent depending on location. Aroclor-1016 was detected in approximately 9 percent of samples collected from the floor and in approximately 4 percent of samples collected from walls/other surfaces below a height of 9 feet from the floor. Aroclor-1242 was only detected in samples collected from ceiling locations (approximately 13 percent) or walls/other surfaces below a height of 9 feet from the floor (approximately 8 percent). Aroclor-1254 and Aroclor-1260 were the only Aroclors detected in walls/other surfaces above a height of 9 feet from the floor.

Table 6-1:
Aroclor Percent Frequency of Detection by Surface Location

Constituent	**Floor**	**Walls/Other Below 9'**	**Walls/Other Above 9'**	**Ceiling**
	%FOD	%FOD	%FOD	%FOD
Aroclor-1254	98.2	95	80	98.6
Aroclor-1260	59.6	53.5	100	55.7
Aroclor-1248	15.8	13.9	0	18.6
Aroclor-1016	8.77	3.96	0	18.6
Aroclor-1242	0	7.92	0	12.9
	n	**n**	**n**	**n**
Number of samples (n)	57	101	5	70

Notes:
1. %FOD - Percent frequency of detection based on number of samples with detected concentration over number of samples collected, by surface location. Zero (0) percent indicates Aroclor was not detected in samples collected from that surface location.

The range of detected concentrations of PCBs in interior building surfaces (excludes caulk, filter, gasket, insulation, pipe, tape) is summarized in Table 6-2 by surface location.

Table 6-2:
Range of Detected PCB Concentrations by Surface Location

Constituent	Floor	Walls/Other Below 9'	Walls/Other Above 9'	Ceiling
	ppm	ppm	ppm	ppm
Aroclor-1254	0.32 – 1,700	1.3 – 45,000	4.4 – 630	0.1 – 8,500
Aroclor-1260	0.62 - 620	0.43 – 15,000	1.2 – 1,000	0.56 – 2,100
Aroclor-1248	0.11 – 2.7	3.7 – 110	ND	0.31 – 100
Aroclor-1016	6.5 – 46	0.61 – 1,200	ND	5.7 - 710
Aroclor-1242	ND	0.62 - 11	ND	0.64 – 71
	n	**n**	**n**	**n**
Number of samples (n)	57	101	5	70

Notes:
1. Range of Detected Concentrations = minimum to maximum detected concentration in ppm.
2. ppm = parts per million
3. ND = Not Detected

6.3.2. Exposure Assessment

The population potentially at risk from exposure to PCBs at this Facility is facility workers. There is no access to the interior of the facility by non-occupational groups of people such as trespassers or children or by other sensitive receptor groups. Based on information provided by MWRA, the number of workers currently present at the facility is not more than 3 persons per shift (during wet weather) and more typically, 1 person per shift (during dry weather). The number of workers at the facility will be further reduced in the future once facility automation is complete, approximately 5 years from now.

There are 3 work shifts: 7 am to 3 pm; 3 pm to 11 pm; and 11 pm to 7 am. During dry weather, each shift is manned with 1 person full time. There is also a rover who comes by twice each shift. Generally, the rover will cover the office (control room) while the operator goes down to the operating level to check on things. During dry weather, the operator spends most of the time in the office area, and about 1 hour on the operating level. He will also rotate through the rest of the facility (odor control, etc.) as needed. During wet weather, there are 2 or 3 persons present throughout the event. These workers are on the operating level (raking screenings, etc.) about half of their work day.

Workers spend most of their time in the office and operating level and less than 10 percent of their time in other areas of the facility, e.g., elevator, upper level, penthouse. Contractors may come to the facility for non-routine repairs in areas less frequented by dedicated personnel. The time spent at the facility by contractors is much less than that experienced by MWRA employees.

Surfaces that are considered likely contact surfaces for facility workers include floors and walls/other surfaces below a height of 9 feet from the floor. There are no routine work assignments that would require facility personnel to contact ceilings or walls/other surfaces above a height of 9 feet from the floor.

Contact with surfaces could occur while touching surfaces with hands. If PCBs are present on a surface, it is assumed for the purposes of risk assessment that dermal transfer of PCBs from the surface to skin could occur. Once on the skin, PCBs could be absorbed through the skin or ingested through hand-to-mouth contact. Another potential pathway of exposure to PCBs in building materials is through contact with dust from abraded building surfaces, via dermal contact, incidental ingestion or inhalation of dust. However, high volumes of dust are not anticipated to be present at the facility because the interior surfaces are painted and the relative humidity of the interior space is high because of the water channel running beneath the operation level floor.

An additional exposure pathway that was considered but ruled out as incomplete is inhalation of volatile PCBs in indoor air. PCBs were not detected, at appropriately sensitive reporting limits in 8 air samples collected at the facility in January 2011. These samples represent 24-hour time integrated air samples collected in close proximity to confirmed PCB-containing paint. The reporting limits ranged from 0.03 to 0.05 micrograms per cubic meter (ug/m^3). This range of values is lower than allowable risk-based concentrations for PCBs in air, such that meaningful comparisons can be made between potentially detectable concentrations and allowable risk-based concentrations.

The indoor air samples were analyzed for 8 Aroclors including those most likely to be measured in indoor air if present. The predominant Aroclor detected in samples of building surfaces is Aroclor-1254. The composition of PCBs that would likely be detected in indoor air samples would more closely resemble an Aroclor having lower levels of chlorination, e.g., Aroclor-1242, 1232, 1221, or 1016. It is predominantly the lower chlorinated fractions that are found in air samples as the result of volatilization. No Aroclors were detected in indoor air samples. The laboratory analytical data sheets for the January 2011 sampling event are included Appendix G.

6.3.3. Current Facility Worker Risk

Based on the concentrations of PCBs detected in floors and walls/other surfaces below a height of 9 feet from the floor, remedial actions are being planned to mitigate potential risks to facility workers. The elevated concentrations of Aroclor-1254 and Aroclor-1260 in particular are presumed to pose an unacceptable risk and thus to necessitate remediation. No actual risk to workers has been identified by this risk assessment. Using the available data, PCB concentrations that exceed 50 ppm by a substantial margin are presumed to represent potential risks to facility workers that exceed regulatory levels of acceptability. As shown in Table 6-2, maximum detected PCB concentrations in floors and walls/other surfaces below a height of 9 feet from the floor are much greater than 50 ppm; however, the maximum concentration detected is not the concentration that would be contacted by worker on a routine basis. U.S. EPA risk assessments rely on exposure point concentrations (EPCs) that better represent an average potential exposure level, based on all surfaces that the worker would likely contact while working at the facility. The 95% upper confidence limits on the mean concentrations (95UCL) are summarized by two groups of contactable surfaces (floors and walls/other surfaces below a height of 9 feet from the floor) in Table 6-3. Concentrations of detected Aroclors are summed to calculate a Total PCB concentration in each sample and the EPC for Total PCBs is calculated as a weighted average of 95%UCLs for samples collected from the floor and walls/other surfaces below a height of 9 feet from the floor assuming equal contact with both surfaces. Other EPCs, that emphasize different surface locations could be calculated. Nonetheless, the EPC for Aroclor-1254 as shown in Table 6-3 exceed 50 ppm approximately 50 times.

Table 6-3:
Average PCB Concentrations (as 95UCL) on Floors and Walls/Other Surfaces

Constituent	Floor	Walls/Other Below 9'	Exposure Point Concentration
	ppm	ppm	ppm
Aroclor-1254	545.4	4,565	2,555
Aroclor-1260	67.58	1,080	574
Aroclor-1248	0.732	12.98	7
Aroclor-1016	9.502	1,200	605
Aroclor-1242	ND	1.935	2
Total PCBs	420.3	6,418	3,419

Notes:

1. 95%UCL = 95% upper confidence limit on the mean concentration, in ppm, calculated using USEPA ProUCL software (latest version).
2. ppm = parts per million
3. ND = Not Detected
4. Total PCBs are calculated for each sample and then the 95UCL value is calculated; thus, the Aroclor-specific 95UCL values do not sum to equal the Total PCB 95UCL values.
5. The Aroclor-1016 concentration in walls/other below 9' is a maximum concentration. A 95UCL concentration was not calculated because there were fewer than 5 detects in the sample set.
6. Exposure point concentrations are calculated as (Floor concentration * 0.5) + (Walls/Other Below 9' concentration * 0.5), in ppm. Values shown are rounded.

6.3.4. Remedial Alternative 1 Risk Evaluation

The remedial alternatives were evaluated relative to effectiveness in eliminating exposure, and thereby, risk to facility workers. Remedial Alternative 1 involves removing paint from all painted surfaces within the building and encapsulating all surfaces with PCBs greater than 1 ppm. Removing paint will reduce potential risks as these painted surfaces are considered contact surfaces for facility workers. Encapsulating the surfaces will prevent worker contact with underlying concrete and will provide a restored surface that is free of PCBs. As shown in Table 6-4, remedial alternatives 2 through 5 include encapsulation but would not provide a greater reduction in risk by removing concrete. The potential for exposure to residual PCBs remaining after implementation of remediation is the same across alternatives 1 through 5, assuming effective encapsulation of contacted surfaces. The structural risks introduced by removing concrete in columns and other structural supports in the building are not outweighed by the benefit, which can be equivalently achieved under remedial alternative 1.

Table 6-4:
Risk Evaluation of Remediation Alternatives

Remedial Alternative		Mitigate Identified Risk	Risk-Benefit	Other Risks
Alternative 1	Remove Paint, Encapsulate Surfaces >1 ppm	Yes	Eliminate exposure	
Alternative 2	Remove Paint & Concrete >50 ppm (<9' from floor and no ceilings), Encapsulate Surfaces >1 ppm	Yes	No greater risk reduction achieved with this alternative	Structural risk introduced
Alternative 3	Remove Paint & Concrete >50 ppm, Encapsulate Surfaces >1 ppm	Yes	No greater risk reduction achieved with this alternative	Structural risk introduced
Alternative 4	Remove Paint >50ppm, Remove Concrete >1 ppm, Encapsulate Surfaces >1 ppm	Yes	No greater risk reduction achieved with this alternative	Structural risk introduced
Alternative 5	Remove Paint and Concrete >1ppm	Yes	No greater risk reduction achieved with this alternative	Structural risk introduced

7. Remediation Plan

7.1. General Overview of Proposed Remediation

The remediation plan for the Facility has been developed to accomplish the following objectives:

- Remove and dispose of PCB bulk product waste in accordance with 40 CFR 761.62;
- Encapsulation of underlying building materials containing PCBs at concentrations exceeding 1 ppm in accordance with the requirements of 40 CFR 761.61(a) *Self-Implementing on-Site Cleanup and Disposal;*
- Recording a deed notice for the encapsulation remedial approach; and
- Long term monitoring of the encapsulated surfaces.

Details of the steps to accomplish the objectives outlined above are provided in the following sections.

7.2. Facility Preparation and Controls

7.2.1. Health and Safety Plan

A Site-Specific Health and Safety Plan (SSHSP) will be developed prior to initiating the work. The plan will be strictly adhered to and implemented by Facility workers, MWRA personnel and visitors. The plan will address (but is not limited to) state and federal regulations including personal protective equipment (PPE), personnel qualification requirements, and Occupational Safety and Health Administration (OSHA) requirements.

7.2.2. Work Area Containment

Work will be conducted in a phased approach. Isolated containment zones will be established around the work area in each phase. Access to the work area will be controlled by the contractor to ensure only authorized personnel enter the containment. The work area will be sealed with polyethylene sheeting and properly vented with high efficiency particulate air (HEPA) filtration. This containment will be maintained to control odors from the encapsulation process. A worker decontamination zone will be established adjacent to the containment access point.

7.2.3. Air and Dust Monitoring

Dust monitoring will be conducted outside the containment zone during removal of caulking and building materials. Dust levels will be minimized by using tools with dust/debris collection systems and wetting materials prior to removal. The containment zone and HEPA filtration within the work zone enclosures will further reduce dust levels. Workers within the enclosures will be required to use respirators, tyvek suits, and other appropriate PPE to limit exposure.

7.3. PCB Bulk Product Removal

Paint and caulking containing PCBs exceeding 50 ppm are PCB bulk product waste as defined in 40 CFR 761.3 and will be disposed of in accordance with CFR 761.62. The process for removing the caulking is as follows:

- The material will be wetted to minimize dust, as described above.
- Caulking will be removed from the joints using machinery and hand tools. A volume estimate for the caulking to be removed is approximately 3 cubic feet for the approximately 600 linear feet of caulking.
- Upon completion of caulking removal, the joints will be inspected and residual caulking will be removed from the surfaces.

Caulking samples containing greater than 50 ppm are summarized in Table 5-1 and include:

- Gray window frame caulk on upper levels;
- The white roof spacer caulk; and
- Gray Louver frame caulk.

A sample of the grade level exterior white window frame caulk exhibited a PCB concentration of 43.6 ppm, and will be managed as bulk PCB Product Waste. As discussed in Section5.2, the majority of caulk identified is located between two adjacent non-porous surfaces.

The process for removing the paint is as follows:

- A containment zone will be established around the work area. If water blasting is the remedial method selected, the containment zone will include a collection system for paint and water.

- If media blasting is used, the surfaces will be wetted prior to removing the paint to minimize dust.
- The painted surfaces will be blasted until visual paint is removed.

Approximately 75,000 sf of paint will be removed from porous surfaces using this method

As discussed above, non-porous surfaces coated with Bulk Product Waste Paint are listed in Table 5-2 and include:

- The gray elevator frames;
- The interior gray window frames;
- The gray drain pipe on LL1 and LL2;
- The gray door on LL2;
- A blue piece of pipe insulation on LL1; and
- The white metal wall paneling on UL1 and UL2.

Many of the non-porous surfaces coated with Bulk Product Waste Paint may be removed and transported for appropriate off-site disposal as part of the planned Facility upgrade activities. For non-porous surfaces that will remain at the Facility, Bulk Product Waste Paint will be removed using the blasting methods outlined above or via chemical stripping methods (where necessary).

7.4. Encapsulation of Building Materials

As described in Section 6, the structural concrete columns, walls, floors, and ceilings contain PCBs at concentrations exceeding 1 ppm will be encapsulated with Sikagard 550W, or an equivalent elastomeric water based acrylic coating. The encapsulation will consist of two coats of contrasting color.

The encapsulation will be completed on the ceilings first, then columns and walls, and then the floors. During ceiling encapsulation, the encapsulant will be applied to the vertical faces of the columns/walls a minimum of 3 inches from the joint. During vertical face encapsulation, the encapsulant will be applied a minimum of three inches onto the ceiling and floor. And during floor encapsulation, the encapsulant will be applied a minimum of three inches up the vertical face. This will ensure adequate overlap at the joints.

The technical specification sheet for Sikagard 550W is included in Appendix H. Successful application of the encapsulant is highly dependent on proper surface preparation including removing interfering materials (loose paint, oil, dirt), scoring the surfaces to ensure proper bond, selecting the proper encapsulant, and implementing a monitoring plan.

Upon completing the encapsulation, baseline verification wipe samples will be collected to evaluate the effectiveness of the encapsulation efforts. Wipe samples will be collected from the encapsulated columns, walls, floors, and ceilings at the following frequencies:

- 1 wipe sample per 2,000 sf of ceiling;
- 1 wipe sample per 2,000 sf of walls and columns above 9 feet;
- 1 wipe sample per 1,000 sf of walls and columns below 9 feet; and
- 1 wipe sample per 1,000 sf of floors and columns.

Encapsulation will be considered complete when all wipe samples indicate surficial PCB concentrations below 10 micrograms per 100 square centimeters (µg/100 cm^2). If wipe samples exhibit PCB concentrations exceeding this threshold, additional layers of encapsulant will be applied, and the area will be re-sampled until PCBs are not detected above 10 µg/100 cm^2.

Wipe samples will be focused in areas of greatest human traffic, based on input from MWRA.

7.5. Storage and Disposal

Bulk materials removed from the Facility will be managed as PCB bulk product waste in accordance with 40 CFR 761.62. If media blasting is used, the media recovered will be managed as bulk product waste.

If water blasting is used, the most effective disposal method will be evaluated. Options include shipping the water off-site or implementing a temporary water treatment system to treat PCB-contaminated water. Treatment materials (activated carbon, filters, and recovered solids) would then be transported off-site as PCB bulk product waste.

Waste materials will be staged in a secure area in Department of Transportation (DOT)-compliant waste containers pursuant to 40 CFR 761.65. Waste containers will be properly labeled in accordance with 40 CFR 761.40.

Completed waste disposal manifests will be included in the completion report submitted to EPA at the completion of the project.

7.6. Long-Term Monitoring Plan

Long-term monitoring of the encapsulated concrete surfaces is necessary to verify that exposure pathways are eliminated by the remedy. A maintenance and monitoring plan (MMP) will be prepared at the completion of the project and will detail long-term monitoring requirements, which are summarized below:

Visual inspections of encapsulated surfaces will be conducted quarterly. The inspections will be focused on exposed surfaces. The inspection will look for weak areas in the encapsulant, such as evidence of wearing, chips, or cracks.

Wipe sampling of the encapsulated surfaces will be conducted annually. Wipe samples will be collected at a frequency of 1 per 5,000 sf of low contact surface, and 1 per 2,500 sf of high contact surface. The sample locations will be selected based on evidence of weak areas described above. If no suspect weak areas in the encapsulant are identified, sample locations will be selected randomly. Wipe sampling will be conducted in accordance with the requirements of 40 CFR 761.123.

Annual reports documenting the findings of the inspections and sampling will be submitted to EPA. The report will include a summary of corrective actions required (if any) and proposed frequency of inspections for the following year.

The MMP will provide guidelines for personnel and maintenance to the building within the project area. It will describe the communications plan for maintenance workers, worker protection requirements, and worker training requirements for work that may affect the encapsulated PCB-contaminated concrete.

7.7. Recordkeeping and Documentation

At the completion of the project, documents and records pertaining to the project will be compiled and maintained at a designated location at the Facility. The documents will include the completion report, which will detail removal activities, encapsulation activities, and verification sampling results. The completion report will also include disposal documentation detailing the volume and destination of waste generated as part of the project.

A deed restriction will be filed for the Facility, detailing the extent of PCBs in concrete in excess of allowable cleanup levels. The deed restriction will remain on the Facility until the PCB-contaminated material can be removed.

7.8. Owner Certification

A written certification, conforming to the requirements of 40 CFR 761.61(a)(3)(i)(E) has been signed by the owner of the property (who is conducting the cleanup) and is provided in Appendix I.

.